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*Andrew Gersey*

Dated

19 April 2004

— U.S. Application 10/824203  
YAQUB, Najem —



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### Cleansing Composition

The present invention relates to a cleansing composition and more particularly a personal cleansing composition intended for use in a shower.

Personal cleansing compositions have been developed for use in showers, such as shower gels. However, large numbers of people prefer to use a conventional bar of soap rather than a shower gel. It is believed that one factor responsible for resistance to the use of shower gels is connected to lather generation. In order to produce lather from a shower gel the user must apply shear to the gel. In some cases much of this effort is wasted as the lather washes away before it can be applied to the body.

10 In order to deal with the problem it is known to provide a shower gel which creates lather as soon as possible after the gel is dispensed from the package.

WO 96/09032A discloses a soap-free post-foaming gel composition which is particularly intended for shaving using a razor. The composition utilises a volatile hydrocarbon such as isopentane to provide a gel structure. Although this composition is satisfactory for its intended purpose it does not perform well for personal washing mainly because it gives an uncomfortable 'stripped' feeling to the skin.

WO 97/03646 discloses a post-foaming gel composition for use in an aerosol container wherein the composition comprises a base material having a viscosity of at least 9500 cps to which is added a foam-forming propellant gas. Whilst this composition has good personal washing properties its viscous nature makes it particularly difficult to process and package and thus there is a high degree of wastage during manufacture.

Attempts have been made to address this problem. For example, WO00/39273 discloses a post-foaming composition of low viscosity which gels upon

addition of the post-foaming agent. However, this sudden, instantaneous gelling can make the composition difficult to fill into suitable packaging and may lead to stoppages and breakdowns in the pipe-work of the plant machinery resulting in plant downtime and inefficient production. This formulation must be filled into required  
5 packaging immediately on addition of the post-foaming agent.

Similarly, GB 2,213,160 teaches of a post foaming gel product containing an anionic surfactant and a non-ionic, ethoxylated fatty alcohol or ester in a ratio of 1:4 to 4:1. The product gels on addition of post-foaming agent and forms a viscous gel prior to filling into a suitable container. This again presents difficulties in terms of  
10 manufacturing due to the high viscosity of the gel formed.

WO 02/05758 discloses a self foaming composition wherein the composition is in the form of a liquid crystalline structure. This results in a soft gel of lower viscosity. Whilst the soft gel is easier to spread onto the skin it has a number of disadvantages compared to a more structured viscous gel. A more viscous gel will  
15 release the post-foaming agent more slowly on agitation and lather is developed in a more controlled manner. Thus it appears that the user is responsible for creating the foam as with conventional cleaning materials and the composition is perceived as providing the behaviour expected for a good cleaning operation. The lather generated from a more viscous gel is creamier than that generated from a soft gel. An additional  
20 benefit of a viscous gel is that the product can be spread further over the body without being washed away as with conventional products. Thus it appears to the user that the product is more economical.

A common problem with currently available post-foaming compositions is their poor long term stability. Compositions having poor long term stability have a limited shelf life. Clearly, this restricts the commercial viability of such compositions as poor long term stability can lead to product wastage should the  
5 product not sell etc.

It is desirable therefore to provide a post-foaming cleansing composition which is sufficiently mobile to facilitate easy processing and packaging, but which has a stable, viscous gel structure when dispensed from its packaging and moreover a viscous gel structure that is maintained throughout a reasonable product lifetime,  
10 under ambient conditions i.e. 20-25°C.

According to the present invention there is provided a post-foaming cleansing composition comprising at least one surfactant, at least one non-ionic gelling agent and at least one post-foaming agent, characterised in that said at least one non-ionic gelling agent constitutes from 0.01% to 8.00% by weight of the composition such that  
15 during manufacture, at least 4 minutes after the addition of the post-foaming agent to the remainder of the composition a gel structure is formed, said gel structure being retained for at least 12 months following manufacture when stored at 25°C or below.

Advantageously, due to the presence of the non-ionic gelling agent, once the composition has been filled into the packaging and allowed to stand the viscosity of  
20 the composition and therefore its gel rigidity increases. This gives rise to a composition which provides a non-mobile, viscous gel which remains substantially unchanged until dispensed from the packaging for at least 12 months following manufacture.

A further advantage of the invention is that the gel structure of the composition of the present invention does not begin to form for a sufficient period of time during the processing and packaging of the composition such that it can be easily pumped and filled into the packaging. Furthermore, there is no gel formation within  
5 plant pipe-work and so stoppages and breakages are minimised.

A further advantage of the present invention is that due to the delayed gelling elevated pressure is not required to pump the composition through the pipe-work. This not only reduces the manufacturing costs of the end product, but it also increases the filling rates meaning more units of composition of the present invention can be  
10 produced in the same time period relative to previously available compositions.

A still further advantage of the present invention is that the long term stability of the product is improved i.e. the gel structure and thus its performance properties remain consistent throughout the anticipated shelf-life of the product.

Thus, neither the appearance of the gel on first dispensing from the packaging  
15 nor the quality of the lather produced upon agitating the gel by the user is compromised for the sake of ease of manufacturing. Furthermore, the physical attributes of the gel are maintained throughout the lifetime of the product.

Due to the volatility of the post-foaming agent, it is not possible to accurately measure the viscosity of the composition following the addition of the post-foaming  
20 agent i.e. the gelled composition. Therefore, the gel rigidity of the composition is used as a measure of the extent to which a composition has gelled.

The gel rigidity test is conducted at ambient temperature of 20 - 25°C where both the can and its contents are at this temperature. The can is held approximately 2 inches above a white sheet of paper and actuated for 2 seconds to dispense the gel.

The characteristics of the gel are observed and scored for Rigidity (R ) using the following arbitrary rigidity rating scale:-

R = 1 Rigid gel with no visible mobility

Gel retains its shape for at least 10seconds after dispensing

5 R = 2 Firm gel with some visible mobility

Gel starts to form into an amorphous mound in less than 10 seconds after dispensing

R = 3 Firm gel with some visible mobility which collapses slowly

Gel forms an amorphous mound on dispensing which slowly spreads

10 R = 4 Thick gel / liquid

Gel has viscous appearance but spreads rapidly after dispensing

R = 5 Thin liquid

Gel has a non-viscous appearance and is runny after dispensing

15 By substantially unchanged it is meant that the score for gel rigidity of the composition does not change by more than 1 unit on the rigidity rating scale.

A particularly important feature of the composition of the present invention is the non-ionic gelling agent. It is thought that it is the combination of the non-ionic gelling agent with the surfactants of the present invention which is responsible for the long term stability of the gel structure.

20 Preferably the non-ionic gelling agent is added in such a quantity that the final gel structure is rigid and scores a rating of R = 1 on the rigidity rating scale. If the quantity of non-ionic gelling agent is too small then a gel rigidity of R=1 is not achieved. Compositions with a gel rigidity of R=3 or softer have poor long term stability and do not maintain the gel structure throughout the lifetime of the product.



Products with good long term stability maintain the structure of the gel such that on dispensing the gel rigidity score does not change by more than 1 unit on the rigidity rating scale throughout the lifetime of the product.

It is thought that the non-ionic gelling agent is also responsible for the delayed gelling of the composition following addition of the post foaming agent.

Upon addition of the post-foaming agent the composition has a gel rigidity rating score of 3 units or more and more preferably 4 units or more. At this time the composition can be described as a mobile gel or liquid. Once the composition begins to form a gel structure it does so such that the composition has a final gel rigidity rating score of  $R=1$  or 2 or more preferably  $R=1$ .

Preferably the gel rigidity of the composition remains substantially unchanged for at least 10 minutes after addition of the post-foaming agent to the remainder of the composition and most preferably for at least 30 minutes after addition of the post-foaming agent to the remainder of the composition.

Suitable non-ionic gelling agents which can be used alone or in combination include alkoxylated alcohols, glyceryl esters, glycol esters, alkoxylated carboxylic acids, alkanolamides and their derivatives. Preferred non-ionic gelling agents include alkoxylated alcohols such as laureth-2, laureth-4, C12/13 pareth-3, cetareth-4 or oleth-3 or glycol esters such as coconut fatty acid monoglyceride polyglycol ether or modified palm oil polyglycol ether.

The particularly preferred non-ionic gelling agent is laureth-4.

The non-ionic gelling agent shall preferably constitute from 0.01% to 4.0% by weight and most preferably from 0.5% to 2.5 % by weight of the total composition.

Surfactants which may be used alone or in combination include any of the following:- anionic, cationic, non-ionic, amphoteric (zwitter-ionic) surfactants and mixtures thereof.

Specific surfactants which may be used alone or in combination include any of the following:- alkyl polyglucosides, ethoxylated and non-ethoxylated metal alkyl sulfates, sultaines, taurates, betaines, sarcosinates, sulfosuccinates, sulfonates, carboxylates, glycines, amphoteric, amphodiacetates, isethionates, quaternary ammonium compounds, polysorbates, sugar esters, alkyl phosphates, propionates, amino acid surfactants, glucosides, alkanolamides and betaines.

10 Preferably the composition of the present invention shall contain at least one anionic surfactant such as alkali metal alkyl ether sulfates, sulfosuccinates and acyl glutamates and/or at least one amphoteric surfactant such as betaines.

A particularly preferred anionic surfactant is sodium lauryl ether sulphate and particularly preferred amphoteric surfactant is cocamidopropyl betaine.

15 The surfactant shall preferably constitute from 0.01% to 30.0% by weight of the total composition and more preferably from 20% to 25% by weight of the total composition. Most preferably the major surfactant (i.e. typically 50% by weight of the total surfactant content) is an anionic surfactant and the ratio of anionic surfactant to non-ionic gelling agent is preferably greater than 4:1.

20 The post-foaming agent used in the composition of the present invention is chosen largely out of consideration for the particular type of composition that is being formulated.

The preferred post-foaming agents are saturated aliphatic hydrocarbons having from 4 to 6 carbons such as n-butane, iso-butane, n-pentane, iso-pentane, iso-hexanes and mixtures thereof.

The post-foaming agent preferably constitutes from 0.01% to 14% by weight  
5 and most preferably from 7% to 11 % by weight of the total composition.

Additional ingredients may be added to the composition of the present invention including any of the following:- fragrances, essential oils, plant extracts, antimicrobial agents, colouring agents, skin conditioning agents, humectants, preservatives, pearlisers, opacifiers, pH modifiers, shimmering agents, exfoliants,  
10 silicone oils, lipids, vitamins, sunscreen agents, skin lightening agents, and mixtures thereof.

Suitable additional ingredients include those which do not affect the gel rigidity of the composition of the present invention thereby avoiding a low viscosity product.

15 Typically, at a least some of the ingredients of cleansing composition such as that described herein, are solids and/or powders. This can give rise to mixing problems as it is more difficult to achieve a homogeneous mixture when some of the components are solids. Furthermore, it may be necessary to heat some of the components thus providing a melt. This introduces extra processing steps and  
20 manufacturing costs.

Thus, the components of the present invention are preferably liquid in order that manufacturing is facilitated.

The present invention is packaged in a container that is suitable for dispensing a post-foaming gel for example a bag on valve system, a bag in can system or an

elasticated bladder container. These types of containers are well known to those skilled in the art.

According to the second aspect of the present invention there is provided a method for the manufacture of a cleansing composition comprising the steps of:-

5 adding from 0.01% to 8.00% by weight of the composition of at least one non-ionic gelling agent to a mixture comprising at least one surfactant and filling the mixture into a package, charging the package with at least one post-foaming agent, and wherein at least 4 minutes after the addition of the post foaming agent to the remainder of the composition a gel structure is formed, said gel structure being

10 retained for at least 12 months following manufacture when the composition is stored at about 25°C or below.

In order that the present invention is more readily understood the composition of the present invention will now be described further by way of example only and with reference to the following examples.

15

Base formulation for examples 1a to 1c

Component	Function	Quantity (% w/w)
Water	Solvent	68.80 – 75.00
Disodium EDTA	Chelating Agent	0.05 – 0.30
Citric Acid	pH Adjuster	0.05 – 0.30
Methyldibromo Glutaronitrile and Phenoxyethanol	Preservative	0.05 – 0.10
Sodium Laureth Sulfate	Primary Surfactant	17.50 – 22.00
Cocamidopropyl Betaine	Foam Booster	0.5 – 3.00
PEG-7 Glyceryl Cocoate	Skin conditioning agent	0.50 – 1.50
Glycerin	Skin conditioning agent	0.10 – 2.00
Colour	Colourant	0.0005 – 0.0010
Parfum	Masking Agent	0.70
Laureth-4	Gelling Agent	As table below

## Examples 1a to 1c

Example	Laureth -- 4 (%w/w)	Isopentane (%w/w)	Viscosity (cP) <i>Measured at 20-25 deg C, Brookfield viscometer spindle 4 speed 20</i>	Time to reach R=1(mins)
1a (control)	0.00	9.00	<100	<1
1b	1.25	9.00	300	15
1c	8.25	9.00	>8,000	<1

"Time to reach R=1 (mins)" refers to the time taken, in minutes, for the composition to form a rigid gel with no visible rigidity following addition of the post foaming agent.

The gel rigidity was determined using the test described herein before.

## Example 2

Component	Function	% w/w	
		2a	2b
Water	Solvent	68.80 - 75.00	78-84
Disodium EDTA	Chelating Agent	0.05 - 0.30	0.05-0.3
Citric Acid	pH Adjuster	0.05 - 0.30	0.05 - 0.30
Methyldibromo Glutaronitrile and Phenoxyethanol	Preservative	0.05 - 0.10	0.05 - 0.10
Sodium Laureth Sulfate	Primary Surfactant	17.50 - 22.00	12.00-14.00
Cocamidopropyl Betaine	Foam Booster	0.5 - 3.00	3.00-4.00
Guar Hydroxypropyltrimmonium Chloride	Skin conditioning agent	-	0.1-0.2
PEG-7 Glyceryl Cocoate	Skin conditioning agent	0.50 - 1.50	0.50-0.150
Glycerin	Skin conditioning agent	0.10 - 2.00	0.10-2.00
Colour	Colourant	0.0005 - 0.0010	0.0005-0.0010
Parfum	Masking Agent	0.70	0.70
Laureth-4	Gelling Agent	1.25	0

Compositions were prepared by the same method as example 1. The composition was filled into a suitable bag-in can aerosol container and tested for gel rigidity.

The samples were stored at the following conditions:

3°C

5 Ambient 20-25°C

37°C

45°C

Samples were removed from the storage conditions at the following intervals:

4 weeks, 8 weeks, 12 weeks, 26 Weeks, 52 weeks

10 At each interval the containers and their contents were equilibrated to ambient temperature of 20-25°C. The gel rigidity test was conducted as described herein. In addition the appearance of the gel was assessed.

**Rigidity scores R = 1 -5**

Example	Storage temperature	Initial	4 weeks	8 weeks	12 weeks	26 weeks	52 weeks
2b	3°C	-	1	3	4	4	4
	20-25°C	1	3	4	4	4	4
	37°C	-	4	4	5	5	5
2a	3°C	-	1	1	1	1	1
	20-25°C	1	1	1	1	1	1
	37°C	-	1	1	2	3	3

15

The examples referred to above were prepared in the following manner:-

1. De-ionised water was placed in a suitable vessel.
2. The chelating agent was dissolved in the water
3. The primary surfactant and foam booster were slowly added to the solution
- 20 with stirring. Stirring was continued until all materials were completely dissolved.
4. The colorant was added to the mixture until completely dispersed.

5. The preservative and glycerin were added to the mixture and stirred until completely dissolved
6. The skin conditioning agent and Fragrance were premixed until homogeneous 7. The premix was then added to the mixture and stirred until completely dissolved.
- 5 8. The non-ionic gelling agent was added to the mixture and stirred until fully dissolved.
9. The pH was adjusted to pH 5.0 – 6.0 with Citric acid.
10. The post foaming agent was stirred into the mixture.
11. The mixture was immediately filled into a suitable aerosol can for a post foaming gel composition.
- 10 12. The gel was dispensed from the can at regular intervals following filling and graded for gel rigidity. The time taken to achieve a maximum gel rigidity was recorded.
- It is of course to be understood that the invention is not intended to be restricted to the
- 15 details of the above embodiments which are described by way of example only.

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